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Date: November 25, 2003

To: Tom Eaton, (360) 753-8080, Cami (206) 553-0124

Tom, attached is the expanded scope document that we discussed. It took longer than thought to put it together. Please feel free to distribute to the group.

* *

Attachment to Teck Cominco American Commitments for Lake Roosevelt Studies

The following summarizes risk assessment activities that will be performed in general concordance with EPA Superfund guidance and will reflect the latest scientific consensus on risk assessment issues, particularly related to the bioavailability of metals. References and detail will be furnished when the documents are prepared.

It is the intent to prepare three ecological risk assessments, one for human health and two for ecological receptors (one addressing aquatic life and another addressing wildlife). The following activities will support these risk assessments.

Task 1 - Human Health Preliminary Data Assessment

Schedule: This is the first activity to be conducted and, together with the subsequent ecological preliminary data assessments, will form the foundation for subsequent tasks. Compilation of existing data and review of data quality are underway. Deliverables associated with this activity are shown below with estimated time for completion.

Description:

Existing site data (metals only) will be compiled into a database (this portion of the task is already underway). A data quality review will be conducted of the existing data to identify data appropriate for use in the human health risk assessment process. The data quality review will include EPA's review and approval of the data review process and results.

A site visit will be conducted by a team of TCAI, consultants, EPA and key stakeholder personnel.

The conceptual site models (CSMs) prepared with EPA technical staff input will be refined further, if appropriate. The problem formulation for human health will then be developed based on the refined CSMs. The problem formulation will include the human health receptors for the site and will describe the screening process that will be used to identify chemicals of potential concern (COPCs).

Using the existing data and process described in the problem formulation, preliminary COPCs will be identified for further evaluation. The COPCs are considered preliminary at this time because the screening process will be repeated after collecting additional data. The problem formulation, existing data, and identified COPCs will be used to identify additional data needs.

This task will include development of preliminary remedial action objectives.

All of the above activities will be conducted through consultations with regulatory agency, tribal and public stakeholders.

Deliverable(s):

1. Data review procedures memorandum to EPA – 1 month after agreement is reached
2. Data quality review report to EPA – 7 months after agreement is reached
3. Data assessment report, which will include the refined CSMs, the problem formulation, selected COPCs, and identified data gaps.

Correlation to the SOW:

This activity is similar to the SOW Section "Collect and analyze existing data and document the need for additional data" and will be used specifically to select historic data appropriate for the Human Health Risk Assessment (HHRA) and to identify additional data and information needed.

Task 2 – Ecological Preliminary Data Assessment (Phase 1 Data)

Schedule: This task is anticipated to be completed approximately 3 months after an agreement is reached.

Description: There are two primary objectives of the preliminary data assessment. The first is to judge the quality, quantity and implications of the existing environmental data for the site. The second is to identify chemicals of potential concern (COPCs) that warrant further investigation. The COPCs identified in the Ecological Preliminary Data Assessment (Phase 1) are considered preliminary because the screening process will be repeated after collecting additional data. This identification of COPCs begins with preparation of elements of the problem formulation because they are essential for screening chemicals for potential risks to aquatic life and wildlife receptors. Development of conceptual site models defining exposure pathways for aquatic life and wildlife represent the first step, and these are followed by identification of the key indicator species that will be the receptors used in selecting COPCs. The third step involves compilation, analysis and synthesis of the existing data that define exposure (Exposure Characterization) and adverse effects (Effects Characterization). Exposures will be based on data defining concentrations of the chemicals detected in the various media and complete pathways identified in the conceptual model. The media will include surface water, sediment and the tissues of plants and animals that are consumed by predator aquatic life and wildlife. The Effects Characterization will be based on laboratory and field data. A comprehensive literature review will be accomplished to define threshold effect levels or comparable benchmarks for use in the identification of COPCs.

Additional specific activities for this Ecological Risk Assessment (EcoRA) task will include those itemized under Task 1 for human health data.

Deliverable(s): Deliverables will include the aquatic and wildlife data assessment reports. These will include the conceptual models, identification of representative

receptors, the data used to define exposure and effects, and the preliminary COPCs for ecological receptors.

Correlation to the SOW: This activity is similar to the SOW Section "Collect and analyze existing data and document the need for additional data" and will be used specifically to select historic data appropriate for use in the EcoRAs and to identify additional data and information needed.

Task 3 – Human Health and Ecological Site Characterization Work Plan

Schedule: The Site Characterization Work Plan design is dependent on the results of the data needs assessments that will be conducted during the two preceding Preliminary Data Assessments (Tasks 1 and 2). Deliverables associated with this activity are shown below with estimated time for completion.

Description: The Site Characterization Work Plan will include a description of the current understanding of the Site, including the physical and environmental setting, fate and transport of metals present at the Site, and ecological characteristics and human uses of the area. The human health and ecological problem formulations will include the human health and ecological CSMs and the effects of drawdown practices in Lake Roosevelt on exposure pathways. The work plan will also include a summary of available data and data usability for site characterization and risk assessments. The results of the Preliminary Data Assessments will be summarized in the work plan, including the procedure for and results of selection of COPCs.

The data needs assessments for the human health and ecological risk assessments, and the proposed iterative, risk-based approach to address the data needs will also be included. A proposed first round of sampling and analysis (Phase 2 data collection) for site characterization will be presented in the work plan along with a proposed approach for defining future sampling and analysis rounds. Data quality objectives (DQOs) for Phase 2 data collection will be presented as well as a proposed approach for future revision of DQOs as needed.

Deliverable(s):

Site Characterization Work Plan – 12 months after agreement is reached (drafts of some elements of the work plan will be submitted to EPA for review prior to the work plan draft, such as the problem formulation and available data and usability summary)

Correlation to the SOW:

This effort is related to the SOW section "Site Characterization" to describe areas of the site that may pose risks to humans or the environment. This document will define the sampling and data needed to adequately characterize the sources and nature and extent of

COPCs at a site. This also provides the basis for an iterative evaluation of data needed for each subsequent phase of the EcoRA and the HHRA.

Task 4 – Human Health Risk Assessment Work Plan

Schedule: The HHRA Work Plan will be developed in conjunction with and submitted shortly after the Site Characterization Work Plan. Deliverables associated with this activity are shown below with estimated time for completion.

Description: The HHRA Work Plan will be developed consistent with US EPA guidance documents for conducting human health risk assessments. The work plan will present the approach that will be used to complete the HHRA and will describe the iterative approach to be used to assess risks to human health at the site. The HHRA Work Plan will summarize the COPC selection process and the preliminary COPCs identified for the site.

The HHRA Work Plan will include an exposure assessment approach that will be developed based on the problem formulation. The exposure assessment approach will include a conceptual site model that identifies potentially complete exposure pathways for identified human receptors. The exposure assessment approach will also include the process that will be used to estimate exposure point concentrations and the equations and assumptions that will be used to calculate intakes.

The HHRA Work Plan will include a toxicity assessment approach that will present the hierarchy of toxicity data sources to be used in the HHRA. The HHRA Work Plan will also present toxicity data for the preliminary COPCs.

Finally the HHRA Work Plan will describe the methods that will be used to estimate noncancer hazards and cancer risks. The risk characterization approach will include a discussion of the approach to uncertainty analysis.

Deliverable(s):

HHRA Work Plan – 12 months after agreement is reached

Correlation to the SOW:

Although the SOW suggests that the Baseline HHRA would be conducted by EPA, it is planned that the Baseline HHRA will be generated by the Teck Cominco Team in consultation with EPA staff. The relevant section of the SOW is the section on "Evaluate site characteristics" as it relates to conduct of the HHRA.

Task 5 - Ecological Risk Assessment Work Plans

Schedule: This task is anticipated to be completed approximately 6 months following the Phase 1 report.

Description: The EcoRA work plans will describe how the risk assessments will be done. Separate work plans will be prepared for the aquatic life and wildlife risk assessments, because the CSMs and data used to assess aquatic life risks are very different from those used to characterize wildlife risks. Each work plan will build upon and use the results of the ecological preliminary data assessments. These will have identified COPCs, media and pathways and areas in Lake Roosevelt (LR) that need further sampling and characterization.

Each work plan will contain complete problem formulation sections. These will begin with descriptions of the relevant features of the chemical, physical and biological environment of Lake Roosevelt and adjacent environs. Each Problem Formulation will include chapters describing the conceptual model, receptor identification (including threatened or endangered species) and chemical sources.

The COPC selection process and identified preliminary COPCs will be included because the COPCs will be the subject of the Exposure and Effects characterizations, which will follow. The Exposure Characterization will identify the environmental concentrations and properties of the COPCs, with special emphasis on their environmental fate. For metals, this will include sections on their speciation, bioavailability, partitioning, and bioaccumulation. The Effect Characterization will focus on the relative sensitivity of aquatic life, plants and wildlife to different concentrations of each of the COPCs. Modes of action on different types of organisms will be addressed. It is anticipated that species sensitivity distributions will be constructed to depict the range of sensitivities to each COPC, if sufficient data are available. The relative sensitivity of fish in general and especially salmonids and walleye (deduced from sensitivity of perch in the same family) will be identified, as will important prey species (e.g., Cladocera, chironomids). Acute and chronic no effect thresholds will be identified for aquatic life and wildlife. Finally, the methodologies for conducting the risk characterizations will be described. The approach for calculating risk quotients will be described as well as methods for estimating risks probabilistically.

Deliverable(s): The key deliverables of this task would be two work plans which will include the documentation of methods to be used in the development of medium-specific, risk-based criteria for protection of aquatic and wildlifel receptors.

Correlation to the SOW: This activity is similar to the SOW Section "Task 3 – Site Characterization" and will be used specifically to define the nature and extent of contamination and identify the exposure pathways and receptors of concern based on

information identified in the ecological preliminary data assessment. As with the Baseline HHRA, it is planned that the Baseline EcoRAs will be conducted by consultants for Teck Cominco with consultation from EPA staff.

Task 6 - Write HH SAP and Conduct Phase 2 HH Data Collection

Schedule: The Phase 2 sampling and analysis plan (SAP) will be submitted after the data needs have been identified in the Site Characterization Work Plan. The Phase 2 Data Collection will be conducted after discussions and approval of the SAP by EPA and its partners.

Description:

The Phase 2 SAP will be prepared to provide a mechanism for planning and approving Phase 2 field activities. The Phase 2 SAP will consist of two parts: the field sampling plan (FSP) and the quality assurance project plan (QAPP). The FSP for Phase 2 will describe the sampling design and rationale for representative areas of the Site based on the data gaps identified. The quality assurance project plan (QAPP) will describe the quality objectives and analytical procedures for Phase 2.

In addition, a health and safety plan (HSP) describing the health and safety protocols to be followed during the Phase 2 data collection will be prepared concurrent with the SAP.

Following approval of the SAP, Phase 2 data will be collected in accordance with the SAP. The phase 2 data collection will address human health and ecological data needs, as appropriate. In addition, engineering and other data and information, such as access to sites by humans, will be collected to support the remedial alternatives assessment.

Deliverable(s):

1. Phase 2 SAP submitted to EPA – 12 months after agreement is reached
2. Phase 2 data collection – completed 20 months after agreement is reached (contingent on approval of the SAP)

Correlation to the SOW:

This activity is similar to the SOW Section "Sampling and Analysis Plan" and will be used specifically to identify the studies that will be used to fill any data gaps identified in the previous tasks.

Task 7 - Prepare Phase 2 Ecological SAP and Conduct Ecological Phase 2 Studies (includes metal speciation)

Schedule: It is anticipated that the Phase 2 studies will be completed within 6 months of approval of each individual sampling and analysis plan. Completion of the Phase 2 SAP includes 2 months to prepare the draft SAP and four months to accommodate the reviews of EPA and the partners, plus prepare second and final drafts in response to comments. It is anticipated that the Phase 2 studies will be completed within 6 months of approval of each individual sampling and analysis plan.

Description: It is expected that additional data will need to be collected to fill data gaps identified by the preliminary screening-level assessment, and this is the objective of this task. The data gaps are expected to include collection of additional samples in specific media and areas in locations that are adequately representative of overall conditions in defined site reaches. Most important will be collection of abiotic and biotic data describing the bioavailability and effects of the COPCs that were identified in the media (e.g., surface water, sediments, tissues). Then the biotic ligand model (BLM[1]) will be applied as appropriate for estimation of bioavailable concentrations of divalent metals. Toxicity will be predicted from the bioavailability data, and the results will be compared to toxicity bioassays conducted with standard test species that are analogues of resident organisms (e.g., chironomids).

Deliverable(s): It is expected that the key deliverable for this task will be a multi-chaptered SAP that presents each laboratory and field study. Each sampling and analysis plan will contain descriptions of the field collection methods and the laboratory analysis techniques. For the COPCs, this would include performing laboratories, analytical instrumentation, detection limits, replication, and quality control samples. The data quality objectives will also be identified in each Phase 2 QAPP. A health and safety plan will be prepared for sample collection activities.

Correlation to the SOW: This activity is similar to the SOW Section "Sampling and Analysis Plan" and will be used specifically to identify the studies that will be used to fill any data gaps identified in the previous tasks.

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[1] This model accounts for competition at gill binding sites between the divalent metal ion and other ionic constituents of the water (Di Toro, D.M., H.E. Allen, H.L. Bergman, J.S. Meyer, P.R. Paquin, and R.C. Santore. 2001. A biotic ligand model of the acute toxicity of metals. I: Technical basis. Environ. Toxicol. Chem. 20:2383-2396.)

Task 8 – Site Characterization Report and Human Health Data Assessment

Schedule: The Site Characterization Report and Human Health Data Assessment will be completed after the Phase 2 Data Collection.

Description:

The Site Characterization Report and Human Health Data Assessment will include a summary of Phase 2 activities and an evaluation of Phase 2 data relevant to the HHRA. The CSM and list of COPCs will be refined, as appropriate, based on the Phase 2 data. A preliminary estimate of risks to human health will be presented, and an evaluation of data gaps, if any. Revisions to data quality objectives (DQOs), as appropriate, will be included.

Deliverable(s):

Site Characterization and Human Health Data Assessment submitted to EPA – 24 months after agreement is reached (contingent on the Phase 2 Data Collection)

Correlation to the SOW:

This effort is keyed to the SOW section "Preliminary Site Characterization Summary" and is developed to determine the use of site data for the HHRA. It is also used to identify any remaining data gaps.

Task 9 - Ecological Data Assessment (Phase 2 Data)

Schedule: This task is anticipated to be completed approximately 4 months after the Ecological Phase 2 studies have been completed.

Description: The data assessment will include a summary of the Phase 2 ecological data collection activities and an evaluation of the Phase 2 ecological data. The preliminary COPCs will be refined using the Phase 2 data. The refined COPCs will be based on an assessment of whether the bioavailable fractions of the COPCs pose potentially significant risks to the various aquatic life and wildlife receptors. The data assessment will include screening level risk assessments (SLRAs) that present preliminary risk estimates for ecological receptors. If sufficient data are available, probabilistic rather than simply quotient techniques will be applied to characterize risk potential.

Deliverable(s): The deliverable would be the Phase 2 SLRA report. Besides estimating preliminary risks, the Phase 2 data assessment will interpret the new data collected relative to the existing data. It is expected that updated interpretations will be rendered and previous interpretations refuted, modified or confirmed. All data used in the report will be presented.

Correlation to the SOW: This activity is similar to the SOW Section "Site Characterization Deliverables," which can be prepared based on information identified and collected during Phase 1 and Phase 2 investigations.

Task 10 - Write Phase 3 SAP and Conduct Phase 3 HH Data Collection (if needed)

Schedule: The sampling and analysis plan (SAP) for Phase 3 will be submitted if additional data needs are identified following Phase 2. The Phase 3 Data Collection will be conducted after discussions and approval of the SAP by EPA and its partners.

Description:

If additional data gaps are identified following Phase 2, the Phase 3 SAP will be prepared to provide a mechanism for planning and approving Phase 3 field activities. The Phase 3 SAP will consist of two parts: the FSP and QAPP. The FSP for Phase 3 will describe the sampling design and rationale based on the data gaps identified following Phase 2. The Phase 2 QAPP will be revised to include the quality objective and procedures for the Phase 3 activities. In addition, the Phase 2 HSP will be revised to include the health and safety protocols to be followed during the Phase 3 data collection.

Following approval of the SAP, Phase 3 data will be collected in accordance with the SAP. The Phase 3 data collection will address human health and ecological data needs, as appropriate.

Deliverable(s):

1. Phase 3 SAP submitted to EPA – If needed, 24 months after agreement is reached (contingent on completion of Phase 2)

2. Phase 3 data collection – if needed, completed 30 months after agreement is reached (contingent on approval of the Phase 3 SAP)

Correlation to the SOW:

This activity is similar to the SOW Section "Sampling and Analysis Plan" and will be used specifically to present the strategy and methodologies that will be used to fill any data gaps identified in the previous tasks.

Task 11 – Write Ecological Phase 3 SAP and Conduct Phase 3 Studies (if needed)

Schedule: This task is anticipated to be completed approximately 6 months following approval of the Phase 2 Ecological Data Assessment.

Description: A third sampling and analysis plan (SAP) may be required because it is possible that not all questions about exposure (including bioavailability) and effects will be answered fully by the Phase 2 investigation. There may be a few key data limitations that need to be resolved by additional sampling and analysis. Thus, the intent of this task is to fill any data gaps remaining from the Phase 1 and 2 assessments. The Phase 3 SAP will be conducted as described for the Phase 2 SAP. The Phase 3 data collection will address human health and ecological data needs, as appropriate. Revised QAPP and HSP will be submitted with the SAP.

Deliverable(s):

1. Phase 3 Ecological SAP submitted to EPA (contingent on completion of Phase 2)

2. Phase 3 Ecological data collection (contingent on approval of the Phase 3 SAP)

Correlation to the SOW: This activity is similar to the SOW Section "Sampling and Analysis Plan" and will be used specifically to present the strategy and methodologies that will be used to fill any data gaps identified in the previous tasks.

Task 12 – Baseline Human Health Risk Assessment

Schedule: The baseline HHRA (BRA) will be completed after adequate data have been collected such that the risk characterization can support risk determinations and risk management decisions for the site (currently anticipated to be at the conclusion of Phase 3 data collection).

Description: The Baseline HHRA will generally follow EPA guidance and format. Included will be an evaluation of data (Phase 1, Phase 2, and possibly Phase 3) relevant to the HHRA, and the identification of chemicals of potential concern (COPCs). The next step will be the finalization of the conceptual site model (CSM). The exposure assessment of the BRA will include the site-specific exposure parameter values and the quantification of estimated doses for receptor scenarios. The BRA will include an assessment of cancer and non-cancer endpoints for COPCs that will then be used to estimate risks to human health. A significant component of the baseline risk assessment is a detailed discussion of the impact of uncertainty of the values of each parameter used and the impact each would have on the final risk estimates. Finally, using the information in the BRA, a series of potential protective concentration levels in the form of risk-based criteria for use in support of risk management decisions.

Deliverable:

Baseline HHRA submitted to EPA – 36 months after agreement is reached (contingent on completion of prior activities)

Correlation to the SOW:

Although the SOW suggests that the Baseline HHRA would be conducted by EPA, in this case the Baseline HHRA will be generated by the Teck Cominco Team in conjunction with EPA staff. The relevant section of the SOW is the section on "Evaluate site characteristics" as it generally relates to conduct of the HHRA.

Task 13 - Sediment Transport (No Modeling)

Schedule: This task is anticipated to be completed approximately 18 months after the beginning of the assessment.

Description: Sediment transport assessments will be an integral part of the overall site characterization, and the results will be reported in the aquatic ecological Baseline RA report. At least basic assessments of the transport and fate of sediments will be required. This task is intended to answer the following key questions:

- Do sediments remain in place or are they transported to other areas over time?
- If sediment is transported, how does this change the magnitude and character of risks over time?

These are fundamental questions that will be addressed by the sediment transport investigation.

The key objective of this task is to determine whether sediments posing potentially significant metal risks, as a result of releases from the Trail smelter, are being actively transported down the Columbia River and into Lake Roosevelt. A variety of survey techniques currently are being evaluated for their ability to address this objective. In areas where sediments posing significant risks are identified, the techniques selected will determine whether the sediments are being eroded or deposited or both. One potential technique would measure changes in bathymetry over time, based on the topographic survey made when Grand Coulee was constructed, a survey performed in the 1970s by the US Bureau of Reclamation, and a new survey being evaluated by TCAI. If the resolution of the bathymetric approach is too low, Lake Roosevelt sediments may need to be sampled to define erosional and depositional zones based on sediment depth or particle size content or both. These surveys would be targeted to areas where there is evidence of potentially significant risk and active erosion or deposition. This task may be conducted during the two lowest pool elevation time periods in Lake Roosevelt to best facilitate rapid sampling over a large area.

If sediments posing risks are being transported within certain areas of the Site, site-specific empirical data on the bioavailability and effects will be collected for identified areas. In this way, information concerning both transport and bioavailability of metals in sediments will be integrated. These data will be collected as part of the Phase 2 or Phase 3 SAPs.

Deliverable(s): The deliverable from this task will be a chapter describing the transport of sediments in Lake Roosevelt. It would be based on historic data and any new data collected. This chapter would be included in the baseline aquatic ecological and wildlife risk assessments.

Correlation to the SOW: This activity addresses the SOW Section "Site Characterization" because it will provide information needed to understand transport of substances within the Site.

Tasks 14/15 - Sediment Transport and Metal Bioavailability Modeling

Schedule: If required, these tasks will be completed approximately 36 months after the beginning of the assessment.

Description: If sediments with potentially significant risks, due to bioavailable metals, are found to be actively transported within some areas of the Site, then modeling the fate and transport will be considered, if the foregoing survey techniques (e.g., bathymetry and topography investigations described above) prove insufficient to characterize metal and particle transport. If the principal risk issue rests with bioavailable concentrations of metals, then sediment modeling would involve a sediment transport model and a bioavailability model. The bioavailability model would be based on two models run simultaneously: biotic ligand model and Windemere Humic Acid Model (WHAM[2]), and these likely would be calibrated with empirical site-specific water effect ratios.

Deliverable(s): The deliverable would be a chapter, to be included in the baseline aquatic ecological and wildlife risk assessments, describing the transport, bioavailability and fate of metals in Lake Roosevelt sediments

Correlation to the SOW: This activity addresses the SOW Section "Site Characterization" because it will provide information needed to understand the transport and bioavailability of substances within the Site.

Task 16 -Phase 3 Ecological Data Assessment (If Needed)

Schedule: This task is anticipated to be completed approximately 4 months following completion of the Phase 3 data collection task.

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[2] This model accounts for the binding of dissolved organic matter to ionic divalent metals in the water or porewater (Tipping, E. 1994. WHAM—A chemical equilibrium model and computer code for waters, sediments, and soils incorporating a discrete site/electrostatic model of ion binding by humic substances. Comp. and Geosci. 20:973-1023.)

Description: This task would be completed if new data were collected under the Phase 3 SAP. The purpose would be to fill any key remaining data needs for specific COPCs, exposure pathways or receptors. The new data would be analyzed as part of the Baseline EcoRAs.

Deliverable(s): This deliverable would be presented as part of the baseline EcoRAs. In the baseline reports, the data collected under the Phase 3 SAP will be described.

Correlation to the SOW: This activity is similar to the SOW Section "Task 3 – Site Characterization" and will be used specifically to refine estimates of exposure, effect and/or extent of contamination.

Task 17 - Baseline EcoRAs (metal issues only)

Schedule: This task is anticipated to be completed approximately 10 months following completion of the Phase 3 data collection task.

Description: Two separate baseline ecological risk assessments will be prepared, one dealing with aquatic ecological risks and the other with wildlife risks. These risk assessments would incorporate data and reports, either directly or by reference, from tasks described above.

The baseline risk assessments would be formatted according to EPA guidance, namely problem formulation, exposure characterization, effects characterization, and risk characterization. It is anticipated that most of the work up through the effects characterization will have been completed and reported as part of tasks described above, leaving preparation of the risk characterizations and compilation of the overall reports as the main activities under this task. The risk characterizations will use a combination of quotient and probabilistic techniques. Quotients will be used, as part of the risk screenings, to identify substances associated with negligible risk. Probabilistic techniques will be applied to COPCs identified as posing potentially significant risks. For aquatic life, it is anticipated that probabilistic techniques will be applied to both exposure and effects data, whereas for some wildlife species, application of probabilistic techniques may be feasible only for characterizing exposures, owing to insufficient effects data.

Deliverable(s): This task is anticipated to be completed approximately 10 months following completion and approval of all previous phases of the investigations. The two baseline RAs will be the single documents that synthesize all information concerning the Site and the risks it potentially poses to ecological receptors.

Correlation to the SOW: This activity is similar to the SOW Section "Task 3 – Site Characterization".

Task 18 - Remediation Alternatives Assessment

Schedule: This will be the last activity to be conducted and will provide EPA a detailed assessment of remedial alternatives for the site. Remedial alternatives will only be considered for the areas that pose an unacceptable risk to potential receptors, which will be determined in the human health and ecological risk assessments. Therefore, the advancement of work on this task beyond the development of Remedial Action Objectives is contingent on the availability of conclusive findings from Tasks 12 and 17.

Description:

- Key findings from the site characterization report and the ecological and human health Baseline Risk assessments will be combined and prioritized in what may be termed a summary Remedial Investigations report.
- A range of removal, containment and institutional control alternatives that have been proven at similar sites will be generated and evaluated to ascertain if these remedial alternatives will be protective of human health and the environment
- Remedial action objectives (RAOs) will be refined from the preliminary remediation goals to establish the objectives that the remedial alternatives need to achieve. The RAOs will be guidelines to manage the unacceptable risk, if any, that was evaluated in the risk assessments
- The list of remediation alternatives will be refined to those that will meet the RAOs and which are feasible at the site
- Each remedial alternative on the refined list will be individually analyzed against a set of nine evaluation criteria, and then a comparative analysis of all alternatives will be performed using the same evaluation criteria as a basis for comparison. The nine criteria will be those stated in the SOW with the exception that the risk-based criteria developed in the RAs will be used in place of ARARs.
- This final comparative analysis will be reported as a Remedial Alternatives Report.

Deliverable:

The product of this task will be the Remedial Alternatives Report

Correlation to the SOW:

This activity is similar to the SOW Sections "Development and Screening of Remedial Alternatives" and "Detailed Analysis of Remedial Alternatives" and will be used specifically to select and compare remedial alternatives appropriate for site conditions.